

Hiroyuki KASHIWADANI\*: On the Japanese  
species of the genus *Pyxine* (Lichens) (2)\*\*

柏谷博之\*: 日本産クロボシゴケ属について (2)\*\*

(5) *Pyxine limbulata* Müll. Arg., Flora 71: 112 (1891).

Type collection: Japan, Shikoku, Prov. Tosa, M. Miyoshi s.n.—holotype in G.

*Pyxine meissneri* var. *vulnerata* Hue, Nouv. Arch. Mus. Hist. Nat., Ser. 4, 2: 83 (1900)—*Pyxine vulnerata* (Hue) Asah., Bull. Nat. Sci. Mus. Tokyo 45: 384 (1959). Type collection: Japan, Prov. Rikuzen, Onikobe, U. Faurie 296—lectotype in PC (not seen) and isotype in KYO.

Reaction: Thallus UV—, K+ pale yellow or —; medulla P—, K—, C—. Chemical substances; small amount of atranorin, K— pigment, and triterpenes.

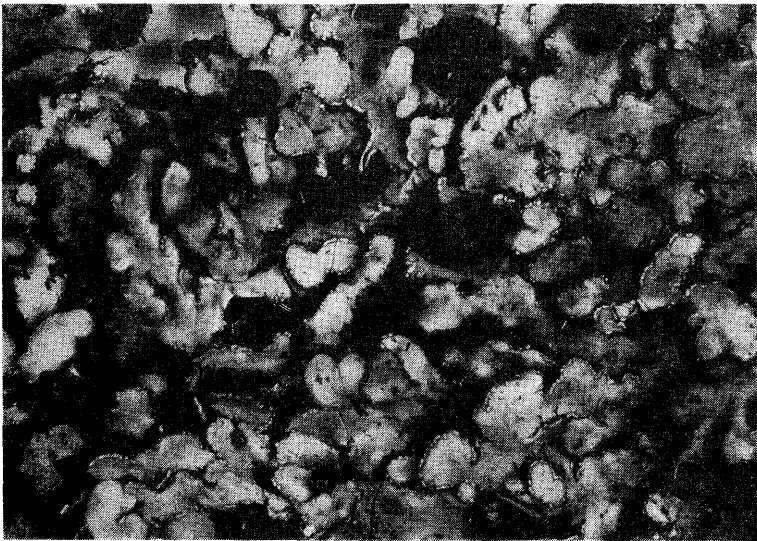


Fig. 4. A portion of the type specimen of *Pyxine limbulata* Müll. Arg. (×7).

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The present species is characterized by the imbricate broader lobes (1.5–3 mm wide) lacking soredia, isidia, and lobules, the yellow-ochre medulla (K–), the pale brown stipe (K+ red), and the lack of lichexanthone.

*Pyxine limbulata* is closely related to *P. endochrysin*, because they have similar lobes with marginal pseudocyphellae and contain similar chemical substances. However, it can be easily distinguished from the latter species by the lack of isidia. It resembles *P. margaritacea*, which was described by Zahlbruckner (1933) from Formosa on the basis of a specimen collected by Y. Asahina (Type: Mt. Ali-san, Y. Asahina F-99—holotype in W and isotype in TNS). As pointed out by Swinscow & Krog (1975b), *P. limbulata* is indistinguishable from *P. margaritacea* in morphology, though different triterpenes are demonstrated in these two species by the TLC methods.

The present species has been reported by Japanese lichenologists as *P. meissneri* var. *vulnerata* or *P. vulnerata*. *P. meissneri* var. *vulnerata* was described by Hue on the basis of eight syntype specimens collected at different localities in Japan. Even though syntype specimens preserved in PC have not been available for the present study, a specimen collected at Onikobe, Prov. Mutsu (Faurie 296) is designated here as the lectotype. Duplicate specimen (an isotype) of Faurie 296 preserved at KYO consists of two fragments and one of them has well developed apothecia.

*Pyxine limbulata* seems to be endemic to eastern Asia, being known to occur in Japan (Hue 1900, Asahina 1959) and China (Zahlbruckner 1930). In Japan it occurs in lowlands of Hokkaido and in deciduous broad-leaved forest in Honshu, Shikoku, and Kyushu. It has been also collected in Formosa by S. Kurokawa and S. Nakanishi.

Representative specimens examined. Honshu. Prov. Rikuchu: Mt. Hayachine, Hienuki-gun, H. Kashiwadani 8983 (TNS); Mt. Iwate, H. Kashiwadani 8865 (TNS). Prov. Ugo: Mt. Shishihana-dake, Yamamoto-gun, H. Suzuki 463 and 485 (TNS). Prov. Hitachi: Ohnaka, Satomi-mura, Kuji-gun, M. Togashi s.n. (TNS). Prov. Iwashiro: Ozegahara, Y. Numajiri s.n. (TNS). Prov. Kozuke: Mt. Akazawa, Azuma-gun, S. Kurokawa 550502 (TNS). Prov. Musashi: Nippara, Y. Asahina 3655 (TNS). Prov. Etchu: Mt. Asahi, Shimonikawa-gun, H. Kashiwadani 6625 (TNS). Prov. Kaga: Mt. Hakusan, H. Kashiwadani 6799 (TNS). Prov. Shinano: Mt. Eboshi, Kitaazumi-gun, S. Kurokawa 520279 (TNS); Mt. Takatsuma, Kamiminouchi-gun, H. Kashi-

wadani 9686 and 9722 (TNS). Prov. Kai: Mt. Minobu, M. Togashi s.n. (TNS). Prov. Suruga: Mt. Sho-Mugen, Abe-gun, T. Komiya 165 (TNS); Mt. Arakawa, H. Kashiwadani 12769 (TNS). Prov. Hida: Kurosawa-guchi 4-gome, Mt. Ontake, Y. Asahina 54096 (TNS). Prov. Ise: Momonoki, Ohsugidani, Taki-gun, Y. Tanaka s.n. (TNS). Prov. Hoki: Mt. Senjo, K. Yasuda s.n. (TNS). Prov. Suo: Mt. Jakuchi, Kuga-gun, H. Kashiwadani 2986 (TNS). Shikoku. Pov. Awa: Nagoro, Higashi-iyayamamura, Miyoshi-gun, M. Togashi s.n. (TNS). Prov. Iyo: Mt. Ishizuchi, S. Kurokawa 72218 (TNS). Prov. Tosa: Mt. Kuishi, Tosa-gun, H. Kashiwadani 6495 (TNS). Kyushu. Prov. Bungo: Mt. Kurodake, Naoiri-gun, M. Omura s.n. (TNS). Prov. Higo: Mt. Koshiraga, K. Maebara s.n. (TNS). Formosa. Prov. Taitung: Mt. Lachialachiaerh, S. Kurokawa 2521 (TNS). Prov. Ilan: Mt. Nan-Fu-Ta-San, S. Kurokawa 970 (TNS). Prov. Nantow: Tui-Kuan-Kao, S. Nakanishi 12931a (TNS).

(6) *Pyxine meissnerina* Nyl., Bull. Soc. Linn. Normandie, Ser. 2, 7: 164 (1873).

Type collection: Bengalia, S. Kurz s.n. 1867—lectotype in H (Herb. Nylander 31775).

Reaction: Thallus UV—, K+ yellow; medulla P—, K—, C—. Chemical substances: atranorin, K— pigment, and triterpenes.

The present species was reported from India (Awasthi 1965) and Kenya by Swinscow & Krog (1975a). Although a specimen collected in the Ryukyu Islands is unfortunately sterile, it is identified with *P. meissnerina* by the broader lobes (1.5–2.5 mm wide), the marginal yellow soralia, the heavily pruinose lobes, the yellow medulla (K—), and the lack of lichexanthone. According to Swinscow & Krog, the apothecia have brown stipes, which show a red reaction with K.

*Pyxine meissnerina* is easily confused with *P. cocoes*, from which it can be clearly distinguished by the yellow soralia and by the negative reaction of lobes under UV light. In Japan, this species is known only from the Ryukyu Islands at present.

Specimen examined. Ryukyu Islands. Nago, Okinawa Island, K. Higoshi s.n. (TNS).

(7) *Pyxine philippina* Vain., Philip. Journ. Sci. Bot. 8: 110 (1913).

Type collection: The Philippines, Subprov. Benguet, ad corticem arborum frondosarum, E.D. Merrill 7934—lectotype in TUR (Herb. Vainio 08707).

*Pyxine glaucescens* Vain., Philip. Journ. Sci. Bot. 8: 109 (1913). Type collection: The Philippines, Comiran Island, Sulu Sea, ad corticem arboris frondosae, E.D. Merrill 7167—holotype in TUR (Herb. Vainio 08705).

Reaction: Thallus UV—, K+ yellow; medulla P+ orange red, K+ yellow afterwards red, C—. Chemical substances: atranorin, norstictic acid, P+ unknown substance, K— pigment, and triterpenes.

This species is characterized by the white maculae and white limbs of lobes lacking asexual propagules, the white medulla, the dark brown stipe of apothecia, and the presence of norstictic acid and P+ unknown substance.

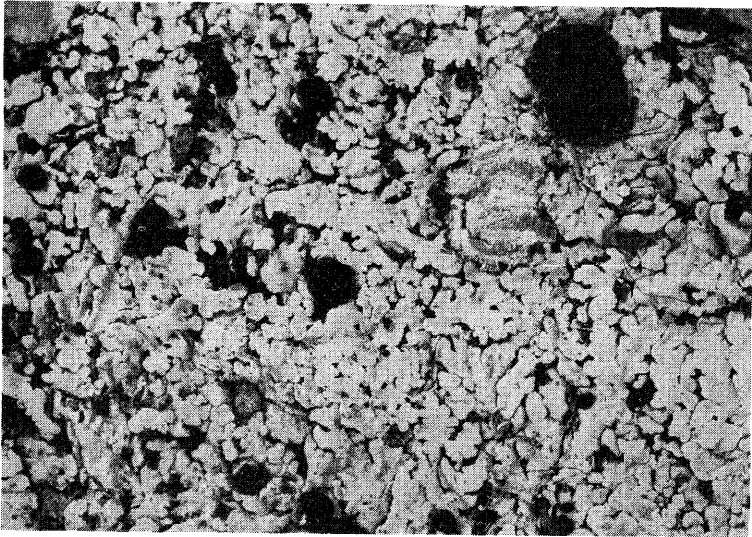


Fig. 5. A portion of the type specimen of *Pyxine philippina* Vain. (×4).

*Pyxine philippina* seems to be closely related to *P. copelandii*, because both species have similar lobes producing the same chemical substances. However, it can be clearly distinguished from the latter species by the absence of soralia. It also resembles *P. rhodesiaca* Vain. ex Lynge, a species widely distributed in tropical areas, from which it can be separated by dark brown stipe of apothecia rather than colorless stipe. In addition, *P. rhodesiaca* lacks norstictic acid and P+ unknown substance, which are constantly produced in *P. philippina*.

Vainio (1913) described *P. glaucescens* from the Philippines. The holotype

of *P. glaucescens* has lobes similar to those of the holotype of *P. philippina*. However, the lobes of the former are grayish green, while those of the latter are grayish white. This difference in lobe color does not seem to have any taxonomic value. Therefore, *P. glaucescens* can be reduced to a synonym of *P. philippina*.

This species has been collected from Japan, Formosa, and the Philippines. In Japan, it is known only from two localities in Kyushu.

Specimens examined. Japan. Kyushu. Prov. Higo: Tomioka, Amakusa-gun, M. Togashi s.n. (TNS). Prov. Ohsumi: Katanozaka, Nejime-machi, Kimotsuki-gun, M. Togashi s.n. (TNS). Formosa. Prov. Taitung: Vicinity of Pasoan, S. Kurokawa 2638 (TNS); Raisha, Y. Asahina F-98b (TNS). The Philippines. Luzon. Bontoc Subprov, ad corticem arborum frondosarum, M. Vanoverbergh 780 (Herb. Vainio 08708, TUR).

(8) **Pyxine sorediata** (Ach.) Mont. in Segra, Hist. Cuba 9: 188 (1842).

*Lecidea sorediata* Ach., Syn. Meth. Lich. 54 (1814).

Type collection: North America (not seen).

Reaction: Thallus UV—, K—; medulla P—, K—, C—. Chemical substances: atranorin, K— pigment, and triterpenes.

Soredia of the present species are usually developed from marginal pseudocyphellae to form marginal labriform soralia. In older lobes, however, the soralia are often spreading over the upper surface covering extensive areas. No apothecium has been found in specimens collected in Japan.

*Pyxine sorediata* is apparently closely related to *P. limbulata*, from which it can be distinguished by the presence of soredia. It may be considered as the sorediate counterpart species of *P. limbulata*, which has no asexual propagules. It is noteworthy that *P. sorediata* has a much wider distribution range than *P. limbulata* does. Namely, *P. sorediata* is common in the Northern Hemisphere, being reported from Japan (Hue 1900, Nylander 1890, etc.), India (Awasthi 1965), North America (Imshaugh 1965), Europe (Poelt 1974), and East Africa (Swinscow & Krog 1975a), whereas *P. limbulata* is endemic to eastern Asia. In regard to the distribution of counterpart species of lichens, similar results were obtained for species of *Parmelia* subgenus *Amphigymnia* (Hale 1965) and in *Anaptychia* (Kurokawa 1962, 1973).

*Pyxine sorediata* resembles *P. meissnerina* in having similar lobes with marginal soralia. However, the soralia of the present species are white,

whereas they are distinctly yellow in *P. meissnerina*. In addition, the upper surface of lobes is thinly pruinose in part in *P. sorediata*, while it is heavily pruinose in *P. meissnerina*.

In Japan, this species is apparently common from Hokkaido to Kyushu though it has never been collected in the Ryukyu and the Bonin Islands. It grows on tree-trunks as well as on rocks.

Specimens examined. Hokkaido. Prov. Kushiro: Shibecha, Kawakami-gun, H. Kashiwadani 8011 (TNS). Prov. Tokachi: Mt. Tsurugi, Kamikawa-gun, H. Kashiwadani 7650 (TNS); Taiki, Hiroo-gun, H. Kashiwadani 7761 and 7685 (TNS). Prov. Hidaka: Logging area at the foot of Mt. Petegari, S. Kurokawa 70271 (TNS). Prov. Iburi: Shishamonai, Chitose city, H. Kashiwadani 8378 (TNS). Honshu. Prov. Mutsu: Lakeside of Towada, Y. Asahina 3660 (TNS); Aomori, U. Faurie 419 (KYO). Prov. Shinano: Mt. Takatsuma, Kamiminouchi-gun, H. Kashiwadani 9679 (TNS); Mt. Shiomi-dake, Shimoina-gun, H. Kashiwadani 9766 (TNS). Prov. Kii: Mt. Koya, S. Kurokawa 57290 (TNS). Prov. Hoki: Tomari-mura, Tohaku-gun, Y. Asahina 6015 (TNS). Prov. Inaba: Tottori, Y. Asahina s.n. (TNS). Prov. Aki: Matsunaga, Kamo-gun, H. Kashiwadani 10184 and 10217 (TNS). Shikoku. Prov. Iyo: Mt. Iwaguro, Ishizuchi Mts., H. Kashiwadani 8523 (TNS); Mt. Takanaawa, Hojo city, H. Kashiwadani 6146 (TNS). Kyushu. Prov. Higo: Aidamura, Y. Asahina s.n. (TNS).

(9) *Pyxine subcinerea* Stirt., Trans. Proc. New Zealand Inst. 30: 397 (1897).

Type collection: Australia, Queensland, F.M. Bailey (not seen).

Reaction: Thallus UV+ yellow, K+ yellow; medulla K-, P-, C-. Chemical substances; atranorin, K- pigment, lichexanthone, and triterpenes.

The distinguishing features for the present species are the marginal soralia, the yellowish ochre medulla (K-), the pale brown stipe (K+ red), and the presence of lichexanthone.

*Pyxine subcinerea* resembles *P. cocoes* in having sorediate lobes as well as in producing lichexanthone. However, the medulla of the present species is yellowish ochre, whereas it is yellowish white to white in *P. cocoes*. In addition, the stipe of apothecium is pale brown in *P. subcinerea* rather than reddish brown stipe in *P. cocoes*. *P. subcinerea* may be confused with *P. sorediata*, from which it can be distinguished by the presence of lichexanthone.

Hue (1900) reported the occurrence of *P. connectans* from Japan on the basis of a specimen collected at Mt. Sobo-san, Kyushu (U. Faurie 193, KYO). Although this specimen is rather small and sterile, it has sorediate lobes with marginal soralia and yellowish ochre medulla and produces lichexanthone. Judging from these characters, this specimen can be identified with *P. subcinerea*.

This species is known from North America, Europe and East Africa. The distribution range now extends to Japan, where it has been collected in western Japan. It has been also collected in Formosa by Y. Asahina.

Specimens examined. Honshu. Prov. Shinano: Osachi-mura, Suwa-gun, Y. Asahina s.n. (TNS); Wada, Kitasaku-gun, M. Inoue s.n. (TNS). Prov. Suruga: Dohniwa, Shimizu-mura, Sunto-gun, Y. Asahina 3662 (TNS). Prov. Izu: Mishima, Y. Asahina, 3664 and 3658 (TNS); Sawaji, Mishima, Y. Asahina s.n. (TNS); Rendaiji, Tagata-gun, N. Ui s.n. (TNS). Prov. Izumo: Nonami, Yatsuka-gun, H. Kashiwadani 8800 (TNS). Shikoku. Prov. Tosa: Muroto Peninsula, Y. Asahina 3665 (TNS). Prov. Iyo: Tachime, Kitauwagun, H. Kashiwadani 10122 (TNS). Kyushu. Prov. Higo: Kameura, Amakusa-gun, Y. Asahina s.n. (TNS). Prov. Hizen: Mt. Tara-dake, Fujitsu-gun, U. Faurie 1706 (KYO). Prov. Hyuga: Mt. Sobo-san, Nishiusuki-gun, U. Faurie 1934 (KYO). Prov. Ohsumi: Kurio, Yakushima Island, Y. Asahina s.n. (TNS), H. Kashiwadani 7243 (TNS). The Amami Islands. Kuchinoshima Island, Tokara Islands, T. Seki 20719 (TNS, HIRO). Formosa. Prov. Nantow: Nichigetsutan, Y. Asahina 3677 (TNS).

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クロボンゴケ属はムカデゴケ科に属する地衣類で世界で約 35 種知られていて、熱帯から温帯にかけて広く分布し、日本からは今まで 7 種類が報告されていた。本論文では日本産クロボンゴケ属の 8 種類を報告した。このうち *P. asiatica*, *P. cocoas*, *P. meissnerina*, *P. philippina*, *P. subcinerea* の 5 種は日本新産である。また従来報告された種類のうち *P. endochrysin*, *P. limbulata*, *P. sorediata* の 3 種類が確認され、*P. connectans* は日本の地衣フローラから除かれた。なお *P. patellaris* は *P. copelandii* の異名であることが確認された。